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Notice of Allowability

Application No.

10/712,236

Applicant(s)

CHEN ET AL.

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the 04-18-2005 amendment.
2. ☒ The allowed claim(s) is/are 12-15 and 18.
3. ☒ The drawings filed on 12 November 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

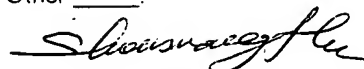
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>20050621</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |



SHOUXIANG HU
PRIMARY EXAMINER

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jiawei Huang (RN: 43,330) on June 20, 2005.

The application has been amended as follows:

IN THE CLAIMS

Claims 1-11. (Cancelled)

Claim 12. (Currently Amended) A diode string structure having ~~a starting end and a terminal end~~, comprising:

a substrate of a first conductive type;

a diode string having a starting end and a terminal end on the substrate;

a first well region of a second conductive type located within the substrate;

a first doped region of the second conductive type located within the first well region, wherein the first doped region is heavily doped and forms the starting end of the diode string structure and adjacent to the surface of the substrate, and the first doped region is coupled to a drain terminal; and

Art Unit: 2811

at least two diode structures located within the first well region, wherein one of the diode structures is a starting diode structure adjacent to the starting end of the diode string structure, one of the diode structure is an ending diode structure as forming the terminal end of the diode string structure, and each of the diode structures comprises:

a second well region with the first conductive type located within the first well region, wherein the second well region is not ~~physically contacted~~ in direct contact with the first doped region; and

a second doped region of the first conductive type and a third doped region of the second conductive type located within the second well region and adjacent to the surface of the substrate, wherein the third doped region and the second doped region are each heavily doped and are not physically contacted in direct contact with each other,

wherein shallow trench isolations regions are formed adjacent to the surface of the substrate, so as to respectively separate immediately neighboring regions of said first, second and third regions.

Claim 13. (Currently Amended) The diode string structure of claim 12, wherein for each of additional diode structures between ~~neither the starting diode structure nor~~ and the ending diode structure in the diode string, there is a post diode structure in the diode string structure directly located next to said each of the additional the diode structures, and the third doped region of said each of the additional the diode structures is coupled to the second doped region of the post diode structure.

Claim 14. (Currently Amended) The diode string structure of claim 13, wherein ~~for the starting diode structure,~~ the second doped region of the starting diode structure is coupled to the first doped region and the third doped region of the starting diode structure is coupled to the second doped region of ~~another~~ one of the additional diode structures next to the starting diode structure in the diode string structure.

Claim 15. (Currently Amended) The diode string structure of claim 13, wherein ~~for the ending diode structure,~~ the third doped region of the ending diode structure is coupled to a ground terminal and the second doped region of the ending diode structure is coupled to the third doped region of ~~another~~ one of the additional diode structures ~~prior to~~ immediately before the ending diode structure in the diode string structure.

Claims 16-17. (Cancelled)

Claim 18. (Currently Amended) The diode string structure of claim 12, wherein the first conductive type is a p-doped type and the second conductive type is an n-doped type, or the first conductive type is an n-doped type and the second conductive type is a p-doped type.

Allowable Subject Matter

Claims 12-15 and 18 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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June 21, 2005


SHOUXIANG HU
PRIMARY EXAMINER